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AND THE SCIENCES SUPPORTING PUBLIC HEALTH

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EDITORIAL

On these pages the editor offers his opinions, unshackled by advertising patrons and unrestrained by anything save a sense of the decent and the truthful—the editor, alone, is responsible for their type, their tone and their tenor.

HUSH!

"Count all th' advantage prosp'rous vice attains
'Tis but what Virtue flies from—and disdains."

Pope: Essay on Man
Epis. iv., Line 89.

LISTEN!

IT is more prevalent than measles, twice as common as tuberculosis, a hundred times as much as infantile paralysis . . .

IT is responsible for 10 per cent. of all insanity, 18 per cent. of all diseases of the heart and blood vessels.

IT holds the dreadful record for dead babies, dead-born—or better dead.

IT imitates every disease, attacks every organ, and has no respect for sex or age or generation. Contracted during adolescence, soothed to a spasmodic sleep by indifferent medical treatment, it seeps its sickening slime to novitiates, unaware. Sometime later, having sapped its victim's brawn it climbs the spinal staircase to putrefy his brain.

And then cometh His beloved sleep—for certainly from this disease, death is a glorious release.

* * * * *

IT is Syphilis—the King's Pox—Lues—Indian measles—Mal francese—Gallische Krankheit—mal de Naples—French pox—Turkish disease—Guaynaras—mal de las Indias.

—by any other name, it smells—to the high heavens!

Listen some more!

Syphilis is not a disease of dirt, not just of the lame and the halt. It is a disease of democracy. It levies its toll alike, on the squatter in the squalor of city dumps, and on the squire who lives on the hill. Men, women and children in every walk of life are prey for its insidious spirilla.

Its victims are legion—its *via dolorosa* delineates the earth.

According to one estimate, the two venereal diseases, syphilis and gonorrhoea cause at least 300,000 deaths in the United States every year—more than six times the fatalities suffered by the American Army in the World War!

* * * * *

But particularly listen to this:

Syphilis can be stopped! Its control, its curtailment, its cure are only matters of organized effort. Yes—even its elimination is not a hopeless task. States a prominent syphilologist: "Almost every early case of syphilis is curable. Late cases can be benefited by treatment. No case is so far gone that it is not worth medical care. We can stop infection, we can make every sufferer more comfortable, and we can often prevent death due to the ravages of the disease."

And it has remained for Doctor Thomas Parran, Jr., Surgeon-General of the United States Public Health Service to bring this slinking hyena of a disease out of the darkness created for it by false notions of propriety and modesty—into the open where good sense and technic may engage it in battle—a battle that must not end until its bones lie white and parched and brittle.

First of all Dr. Parran has publicized its terrors, in no uncertain terms. He has taken the taboo, the prudishness, the Sunday-school attitude out of its discussion in public print.

He exposes it, in all of its shameful nakedness.

In recent years our novelists have loaded their stories with swift-selling sex scandals—and deftly have the tabloids turned to their eternal triangles—but until recently no newspaper dared even mention the venereal distresses!

Our advertising intellectuals in the past have not been bashful in making capital of the intimacies of halitosis, of feminine hygiene and body odor—and many other such symbols of a silly salesmania, yet, even they, tabooed the terms of venereal pathology.

But at last, with sanity of speech, bluntness of expression and an enlightened public opinion AMERICA BEGINS THE WAR ON SYPHILIS.

But there is more to this fight than mere public education and pusillanimous propaganda.

It does not suffice that the public alone shall know the truth. The professions supporting public health, and particularly the medical profession, should face the grim facts.

The syphilitic is a public menace, particularly when the disease is active and vicious. As with the leper, his welfare, for the sake of society, is the State's concern. Everyone knows that the registration of venereal victims, as demanded by the laws of many States is accepted by medical men as a farce. Not one in a hundred syphilitics is so registered and not ten in a hundred who go to the practicing physician receive intelligent medical treatment, treatment that methodically, meticulously, mercilessly continues until the Kahn—the Wassermann—the Colloidal gold reaction, if needs be—and every other diagnostic test *yells*—NEGATIVE!

Nor need we blame the private physician for what seems like his delinquency, for the adequate treatment of syphilis demands institutional facilities and disciplinary measures and also a definite, resolute co-operation from the patient, which is but rarely afforded the private doctor.

Actually, and no matter how we may feel toward the State control of medicine, it is a fact that the quickest, most certain victory over these venereal diseases could be had by the State-regulated compulsory registration and the State-instituted rigid treatment of the sufferers, whether they be denizens of the sewer or budding debutantes in high society.

Then, would the quack of all kinds be quickly disposed of. Vicious patent medicines, allegedly curative of these diseases, would be curbed, and all else than a sane, scientific, medically supervised technic of prevention and treatment would be definitely outlawed.

The inescapable truth of the matter is that syphilis and gonorrhoea can only be forever conquered, when a ruthless, rigorous, organized war is conducted, not by guerilla-minded compromising ineffectuals but with the full force of the State dedicated to a campaign of utter extinction.

IVOR GRIFFITH.

ARSENOMANIA

IN a frenzied, panicky battle against the grubs and bugs and beetles that threaten to eat God's chosen children from their earthly house and home, a tremendous tonnage of arsenic has been sprayed and spread all over the land.

It has come to such a pass that an apple a day no longer keeps the doctor away but beckons him in with his stomach pump. Arsenical spray residues are so common on these orchard fruits that, in several States, fruit-growers combine to operate apple laundries, where with kerosene and silicate and similar detergents they wash the fruit to make it legal and tolerably safe to sell within and without the state.

Just how far the continued impregnation of our soil, year in, year out, with this increasing menace, will affect public health and welfare, is difficult to state, but there is another important angle to the issue. Copisarow, the British biologist, who has recently advocated and advanced the cause of maleic acid as a fungicide, writes the following interesting and significant communication to *Science:*

"RECENT experience [1] shows that the effect of poison-sprayers (arsenic, copper, lead, etc.) is found to extend much beyond its immediate objective, namely, the protection of crops against parasitic attacks.

"Apart from its inability to discriminate between friend and foe, this treatment represents in its cumulative poisoning action upon the soil a grave danger to future plant life both by (a) its inhibition of growth and (b) *the introduction of toxic constituents into plant metabolism.* A greater stress upon the augmentation of the plant's natural means of protection, such as sanitation, nutrition and stock selection, might perhaps lessen the recourse to these artificial protective means.

"Now from the work of Greenbank [2] on the inhibition of rancidity in fats and oils (with a possible extension to cereals) by maleic acid, and that of Copisarow [3] on (a) the bactericidal and fungicidal properties of maleic acid, (b) the close chemical and physiological resemblance, if not identity, of maleic acid with the natural inhibitor —"blastokolin"—present in fruit and vegetables and (c) the probable transition of this inhibitor into the natural accelerator (ethylene), a transformation marking the ripening stage in fruit development and

expressed chemically by the degradation of maleic acid to ethylene and carbon dioxide—it appears that the substitution of the poison-sprayers by the natural inhibitor may constitute a practical means of assisting the plant's self-protection. As in the case of stored fruit and vegetables spraying with a solution or emulsion of maleic acid in ethereal oil, paraffin, solvent naphtha or some other suitable medium may perhaps be found effective for such plant treatment."

The sooner Science finds a method of fighting the bane of bugs with something less hazardous than arsenic,[4] the better it will be for the present race of man, and for many generations to come.

IVOR GRIFFITH.

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2. Greenbank, U. S. Pat., 1898, 363, Feb. 21, 1933; *Science*, 77: Suppl., page 6, February 24, 1933.
3. Copisarow, *Jour. Pom. Hort. Sci.*, 14:9, 1936.
4. Griffith, *This Journ.*, *98*, 137 (1926) and *103*, 349 (1931).

Plant Growth Hormones, A. E. Hitchcock, *Merck Report 46,* 22 (1937). As a result of recent discoveries concerning the nature of growth-stimulating substances in plants, namely the "auxins", the Boyce Thompson Institute has determined that entirely different substances possess auxin-like properties. Among these are indoleacetic acid from animal urine, indolebutyric acid, gases such as carbon monoxide and ethylene and certain pure liquids and crystalline substances. Of thirty gaseous, liquid and crystalline materials examined only one occurs in plants.

The effect of the substances, depending on method of use and species of plant, is to produce in a relatively short time the bending of stems or leaves and the local production of roots. Cuttings are placed in a solution of the growth-stimulating substance for from four to forty-eight hours and transferred to ordinary propagating beds. Treated cuttings root quicker and have more roots per cutting. Various species of plants have been treated with good results, such as roses, dahlias, certain evergreens and succulent plants like the tomato. For scientific and classroom experiments the growth-stimulating substances are applied in aqueous solution or in lanolin.

Plant growth hormones will soon be available to plant growers and will be distributed through wholesale druggists. E. H. MCL.

ORIGINAL ARTICLES

CHEMICAL MICROSCOPY OF FATS AND WAXES

III. CASTOR OIL

By L. Wilson Greene
Aberdeen, Maryland

Wherein the Author describes a novel micro-procedure for the specific identification of raw and chemicalized Castor oil.

THE purpose of the present investigation was to develop a micro-procedure which would be specific for the rapid identification of small quantities of castor oil. The experiments with this fat form a part of the general study pertaining to the chemical microscopy of fats and waxes which the writer described in some detail in 1934 (1), and more recently in a brief summary (2). Results so far indicate that a satisfactory method for the micro-identification of castor oil has been developed.

EXPERIMENTAL

Specimens Used

Specimen No.	Description
12	Castor oil, grade AA, 4 yr. old.
17	Sulfonated castor oil, H. A. Metz & Co., 4 yr. old.
18	Castor oil, grade No. 3, 4 yr. old.
22	Castor oil, white, 4 yr. old.
44	Castor oil, No. 1, U. S. P., 6 mo. old.
91	Blown castor oil, 1 yr. old.
97	Sulfonated castor oil, 50%, Jacques Wolf & Co., less than 1 yr. old.
98	Sulfonated castor oil, 75%, Jacques Wolf & Co., less than 1 yr. old.
99	Sulfonated castor oil, 85%, Jacques Wolf & Co., less than 1 yr. old.
243	Castor oil, white, less than 1 yr. old.
275	Castor oil, "National" brand, U. S. P., 2 yr. old.
276	Castor oil, "Crystal" brand, U. S. P., Baker Castor Oil Co., age unknown.
277	Mixed castor fatty acids, freshly prepared.
278	Polymerized castor oil, prepared by heating specimen No. 276 at 130° C. for several days.
280	Castor oil, technical grade, 10 yr. old.
282	Castor oil, "Golden Bond" brand, cold-pressed, U. S. P. and "C. P.", Spencer-Kellogg & Sons, less than 1 yr. old.

The ages of the specimens in the above table are approximate.

Reaction with Alcoholic Potassium Hydroxide

The reagent was prepared by dissolving potassium hydroxide in absolute ethyl alcohol to saturation. A small stick of the KOH was washed first with water to remove carbonate and then with three successive portions of absolute alcohol. The purified material was then used to prepare the reagent solution. This is a slight modification of the method recommended by Rosenthaler (3).

A drop of the specimen (about 2 mm. in diameter) was transferred to a glass microscope slide and a drop of approximately the same quantity of reagent was intimately mixed with it, using a small glass stirring rod. The preparation was covered with a glass slip and examined under the microscope using a magnification of 430x. No crystalline reaction product was formed immediately but, after standing 24 hours at room temperature, crystals of the potash soap developed. These are illustrated in Fig. 1. These crystals were not considered sufficiently distinctive because other fats had yielded similar products with the reagent, so very little work was done with this micro reaction.

Reaction with Sodium Hydroxide in Benzyl Alcohol

A mixture of benzyl alcohol and a large excess of sodium hydroxide was heated to boiling on a hot plate. The solution was allowed to cool and the clear syrupy liquid decanted from the undissolved NaOH. The reagent solution is unstable.

The test procedure described in the preceding section was employed. In about one minute, examination at a magnification of 430x showed the preparation to be filled with crystals like those illustrated in Fig. 2. As in the former instance, the crystals were not found to be distinctive so further work with this reagent was discontinued.

Reaction with Potassium Hydroxide in n-Butyl Alcohol

A small stick of potassium hydroxide was purified by washing first with water and then with three successive portions of n-butyl alcohol, and dissolved in the latter to form a saturated solution. The reagent is stable and one lot was employed with satisfactory results for over two years. Duplicate experiments with different lots of the same reagent gave uniform results.

All specimens listed in the table were tested with the reagent by the mixed drop procedure. In every case, except with specimens Nos. 17, 91, 97, 98, 99 and 277, characteristic crystals of the reaction product were observed at 430x, as shown in Fig. 3.

In one experiment, specimen No. 91 developed a few crystals of this type after the preparation had stood for 24 hours at room temperature, but a duplicate trial gave no crystals at all in 12 days.

The formation of the crystalline reaction product generally takes place at once, but in a few instances as long as 20 minutes elapsed before the characteristic forms appeared. This depends perhaps on the quantity ratio of sample to reagent and on the purity of the specimen.

The reaction product always assumes the shape of small rosette-like aggregates with crystalline centers. Only castor oil, among over 200 specimens of fats examined with the reagent, produced this type of crystalline soap.

With mixed castor fatty acids (specimen No. 277), the KOH-butyl alcohol reagent yielded the crystalline reaction product, easily visible at a magnification of 100x, illustrated in Fig. 4. The crystals are, however, not characteristic.

Reaction with Phenylhydrazine

The foregoing reactions are based on the formation of crystalline soaps. When phenylhydrazine is caused to react with certain fats, the phenylhydrazides of the constituent fatty acids are formed and, in most instances, these products are crystalline. Van Alphen (4) has described the phenylhydrazide of ricinoleic acid, formed by heating castor oil with an equal quantity of phenylhydrazine. The method given below is an adaptation of van Alphen's procedure.

A small drop of the specimen was mixed with about an equal quantity of phenylhydrazine on a slide. A cover slip was placed over the preparation and the slide was gently heated over a flame until white fumes escaped from under the slip. The preparation was allowed to cool and was examined periodically under the microscope for appearance of crystals. After standing for 13 days at room temperature, the crystals shown in Fig. 5 were seen at a magnification of 100x.

The length of time required for the crystals to form, and similar experience with other fats using this reagent caused discontinuance of experiments with phenylhydrazine for the present.

Fig. 1

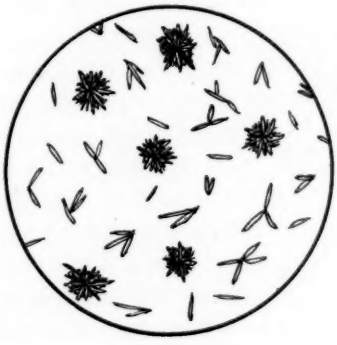

Fig. 2

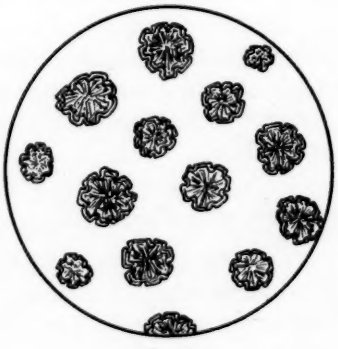

Fig. 3

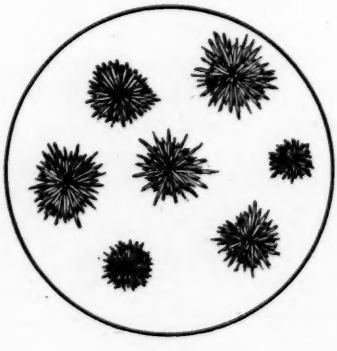

Fig. 4

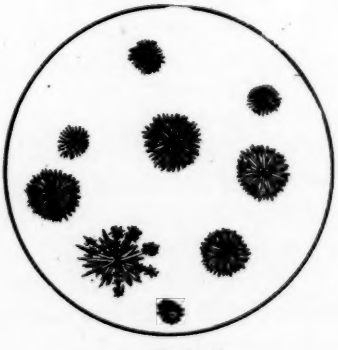

Fig. 5

DISCUSSION

Of the four reactions employed, that with the KOH-butyl alcohol reagent gave the most consistently positive results. The other saponification reactions investigated did not produce crystals which were characteristic of castor oil. Phenylhydrazine, although yielding crystals with castor oil under the conditions described, required such a long time to accomplish this that it was abandoned as impractical.

Rosenthaler (3) obtained rounded aggregates as the result of the micro-reaction between castor oil and saturated alcoholic potash. The sketch in the paper reporting his work shows the form of these aggregates similar to those illustrated in Fig. 3. He states that these were formed immediately and on standing they became converted to a mass of rods and needles. It will be noted that the writer obtained needles (Fig. 1) with alcoholic potash, and the rosette-like forms only with the KOH-butyl alcohol reagent. With alcoholic sodium hydroxide Rosenthaler obtained crystals very similar to the radiating clusters of needles shown in Fig. 2. He does not describe the specimen of castor oil used or state the number of samples investigated.

In addition to the gifts of specimens already acknowledged by publication, the writer wishes to thank Jacques Wolf & Co. of Passaic, N. J., for three samples of sulfonated castor oil used in this work.

SUMMARY

A saturated solution of potassium hydroxide in n-butyl alcohol appears to be a specific reagent for the micro-identification of castor oil. A small drop of the specimen under examination is mixed with an equal quantity of reagent and observed under the microscope at a magnification of 430x. The procedure has been uniformly successful with all samples of castor oil tested, regardless of age or purity, but it is not applicable to the various grades of sulfonated castor oil nor to mixed castor fatty acids. The utility of the method for identifying blown castor oil is doubtful. It has not yet been applied to mixtures of castor oil with other fats.

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AN HISTORICAL SKETCH OF THE HOUSE OF SOLOMONS IN SAVANNAH

By William A. Proût, B. Sc., A. M., Phar. D.*

General Robert E. Lee had his prescriptions compounded at this venerable apothecary shop in Savannah.

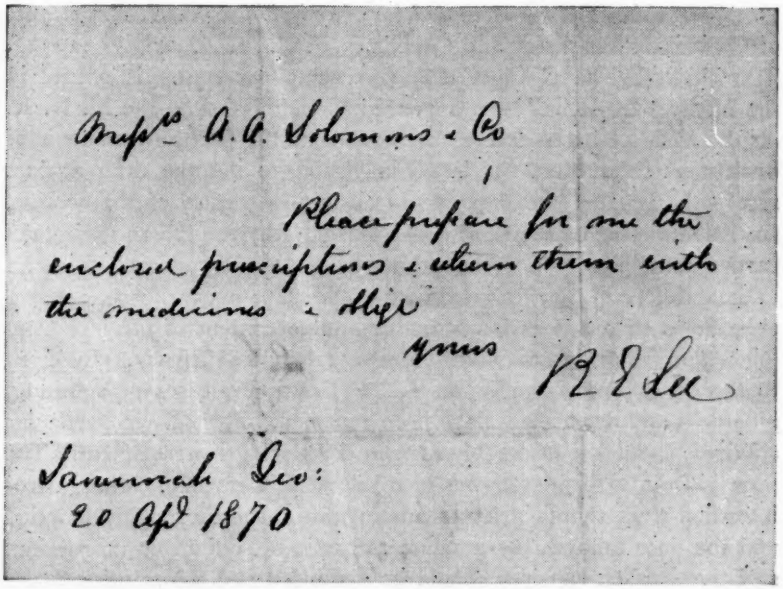
SOME few years ago when the *Morning News* of Savannah, Georgia, made a survey and tabulation of the pioneer institutions and business houses of that city still in existence, the drug firm of Solomons was accorded fourth place among the institutions and the oldest ranking among the business firms. This is of especial interest to the medical and pharmaceutical professions inasmuch as this well-known company has been in continuous operation under the management of the same family since its establishment almost a century ago.

The House of Solomons originated in 1845 when Mr. Abraham A. Solomons, then a resident of South Carolina, moved to Savannah in order to fill a vacancy in the company which was composed of Dr. Philip Minus and a Dr. Mackey. It was when the former moved away, and upon the retirement of the latter, that Mr. Solomons assumed complete control of the business. He was soon joined by his brother, Mr. Joseph M. Solomons, who remained active in the firm for over seventy years, with the exception of four years of service in the Confederate Army, until the time of his death in 1921, at the age of ninety-six.

Mr. Abraham A. Solomons, the founder, did not see active service in the army during the war between the states, as he was too badly needed as a pharmacist at home. However, he was a captain in the Home Patrol Guard. He was formerly a resident of Charleston, where he served his apprenticeship under a Dr. Sims with whom he boarded while attending the Medical Society of South Carolina. On October 15, 1835, he was granted a license by the Medical Society of South Carolina "to carry on the Business of Apothecary and Druggist in all of its branches." It is interesting to recall here that South Carolina was the first state in the Union to issue such a

*Assistant Professor of Operative Pharmacy, The Medical College of the State of South Carolina.

license. Mr. Solomons' long and fruitful service in the company terminated at his death in 1899 at the age of eighty-three. His brother then succeeded him as president. Mr. I. A. Solomons, son of the founder, also served the company for over forty years and was its president at the time of his death in 1929. He also served as vice-president of the National Wholesale Druggists' Association. At the present time, three of his sons comprise the executive management, carrying on with much credit and capability the heritage left them by such pioneering, resourceful ancestors. Mr. Abraham A. Solomons, namesake of his distinguished grandfather, the founder, is president; Mr. I. A. Solomons, Jr., is vice-president; and Mr. J. M. Solomons, namesake of his uncle, the second president, is secretary.


Messrs A. A. Solomons & Co

Please prepare for me the enclosed prescriptions & return them with the medicines & oblige

Yours R E Lee

Savannah Geo:
20 Apl 1870

When General Robert E. Lee visited Savannah in 1870, he left an order for medicines with Solomons which is here reproduced. The prescriptions accompanying the order were evidently returned to General Lee as per his instructions, as they have not been located. Incidently, this original order which is now yellowed with age, but in a fine state of preservation, is one of Solomons' most treasured possessions.

ABSTRACTS FROM AND REVIEWS OF THE LITERATURE OF THE SCIENCES SUPPORTING PUBLIC HEALTH

Bacteriology . . . . **Louis Gershenfeld, B. Sc., Ph M.**
Biochemistry, Nutrition, etc. . . . **Arno Viehoever, Ph. D.**
Biology . . . . . **Marin S. Dunn, Ph. D.**
Chemistry . . . . . **Arthur Osol, Ph. D.**
Pharmacy . . . . . **E. Fullerton Cook, Ph. M.**
and their assistants

Tetrachlorethylene Accepted for Admission to N. N. R. Report of Council on Pharmacy and Chemistry, *J. A. M. A. 108,* 46 (1937). Tetrachlorethylene C Cl_2:C Cl_2 (99.0-99.5 per cent.) is official in the N. F. VI. It has been approved for admission to the N. N. R. on the basis of its usefulness as a anthelmintic for the treatment of hookworm infestation. It is not advisable to use the drug against ascaris because of the danger of causing migration of the worms. Investigators have concluded that tetrachlorethylene is less toxic than carbon tetrachloride and that it is at least equally efficacious as an anthelmintic. It possesses a further advantage over carbon tetrachloride in that it does lower the guanidine content of the blood, an important factor in cases exhibiting a calcium deficiency. Reaction to the drug is not usually severe, but some few cases of vomiting, giddiness and drowsiness have been reported. Patients, in particular children, should be preferably kept in bed during the treatment. The dose is from 1 to 3 cc., given in a soft gelatin capsule. The gastrointestinal tract should prior to administration be thoroughly emptied and the dose followed by a saline cathartic of sodium or magnesium sulfate. Broken capsules should be discarded and the solution never employed if it has been exposed to the air for more than a brief time, because of the possibility of phosgene formation by decomposition. L. F. T.

Hydrogenated Castor Oil as an Ointment Base. George W. Fiero, *J. A. Ph. A. 25,* 862-863 (1936). Hydrogenated castor oil may

be obtained with varying degrees of firmness, dependent upon the amount of hydrogenation. Two types were obtained from the research laboratory of Spencer-Kellogg and Sons, a "soft" variety, corresponding to the consistence of lard (m. p. 40° C.) and a "hard" type having a firmness approximately that of spermaceti (m. p. 82° C.).

These products do not become rancid and their absorption factor for water is greater than that of petrolatum or lard (soft hydrogenated castor oil, 5 per cent. water; hard hydrogenated castor oil, 8.5 per cent. water; petrolatum, 1.7 per cent. water; lard, 3.7 per cent. water).

The author prepared official ointments replacing petrolatum or wool fat with the "soft" variety and waxes by the "hard" type.

Ointments of belladonna and iodine were specially satisfactory. Ointments containing vegetable extracts were of good appearance and consistence since alcoholic diluents are miscible with these hydrogenated oils. E. F. C.

Serum Therapy. C. E. Dolman, *J. Can. Med. Assoc. 35,* 628 (1936). A review of serum therapy and the value of the latter in infections are given. Though diphtheria and tetanus toxoids are used in increasing amounts the respective antitoxins are as yet the most important serum products and the use of large doses of tetanus antitoxin was stressed. Valuable antitoxins are available for the neutralization of the toxins of most hemolytic streptococci and for staphylococci. The importance of the gas gangrene antitoxins was mentioned. Antisera are available and have been used with some success for infections caused by the meningococcus; pneumococcus; B. dysenteriae, Flexner; B. dysenteriae, Sonne; H. influenzae; B. typhosum; and Br. abortus. L. G.

Active Immunization Against Tetanus With Tetanus Toxoid. W. W. Hall, *The Military Surgeon 80,* 104 (1937). Immunization of recruits with two injections of refined tetanus toxoid (Alum Precipitated) eight weeks apart is recommended so as to have a military population of men possessing an immunity against tetanus or lockjaw. It is a safeguard that could be employed ad-

vantageously in selected groups to determine its effectiveness for large numbers. L. G.

A New Treatment for Trichomonas Vaginitis (Preliminary Report). F. B. Zener, *Northwest Medicine 36,* 8 (1937). The incidence of trichomonas vaginalis infestation in females of all ages is much greater than commonly realized. The use of an amebacide was deemed advisable. Vioform (N. N. R.), iodochlorhydroxyquinoline, in an ointment base, using one-half ounce of the preparation at each time containing 0.75 gm. of Vioform was found effective.

L. G.

The Role of Lactobacillus Acidophilus in the Treatment of Disorders of the Digestive Tract. W. H. Pipes and W. L. Owen, *New Orleans Medical and Surgical Journal 89,* 355 (1937). A new acidophilus product, designated as lacto yeast, is here presented. This consists of a mass containing a high concentration of L. acidophilus with yeast in a stable form, possessing a taste and odor that are not objectionable. L. G.

Autoxidation of Ascorbic Acid (Cevitamic Acid) and its Inhibition by Sulfur. J. C. Ghosh and P. C. Rakshit, *Biochem. Z. 289,* 15 (1936), through *Squibb Abstract Bulletin 10,* 121 (1937). Atmospheric oxidation of pure crystaline synthetic ascorbic acid at 30° C., followed manometrically by the method of Barcroft and Warburg, was accelerated upon increasing the pH from 5.8 to 7.2 and by the addition of cupric ion in 10^{-6} molar concentration. The oxidation was not affected by potassium cyanide in 10^{-5} molar concentration at a pH of 8.0. The addition of cysteine, cystine, hydrogen sulfide and thiolactic acid, in concentrations of 10^{-6} to 10^{-4} molar, inhibited the oxidation, presumably by taking up the activated oxygen which is believed to be responsible for the autoxidation of ascorbic acid. A. O.

The Toxicity and Fate of Diethylene Glycol When Administered to Animals. H. B. Haag and A. M. Ambrose, *J. Pharm. and Exper.*

Therap. 59, 93 (1937). Although several medicinal uses of ethylene glycol were suggested by certain workers twenty years ago, it is only within recent years that any of the glycols have been considered pharmacologically or proposed for practical employment in products for human use. Ethylene glycol, diethylene glycol and propylene glycol are the three compounds which have received the most attention. Results of some workers indicate that the toxicity of ethylene glycol is of a rather low order both acutely and chronically,* however, this belief is not unanimous.* Propylene glycol is considered to have a toxicity lower than ethylene glycol.* Although diethylene glycol is claimed to be superior to glycerin in cigarette manufacture, little has been published relative to its toxicity. The authors working with both rats and rabbits studied the toxicity, both acute and chronic, of diethylene glycol. The following results were obtained: The acute toxicity of diethylene glycol was found to be twice as toxic to rabbits as either ethylene or propylene glycol. When administered in small doses to rats small concentrations (0.03-0.1 per cent.) of diethylene glycol seemed to slightly enhance their rate of growth but glycerin in a concentration which in the case of diethylene glycol proved rapidly fatal (3-10 per cent.) actually maintained the growth rate at or slightly above normal controls. In the rat both diethylene glycol and glycerin lead to an increase in urinary oxalic acid, although it appears that, quantitatively, glycerin is less prone to do so. A dog fed diethylene glycol, 2 cc. per Kg. per day, showed an insignificant increase in urinary oxalic acid. Much of the drug was eliminated unchanged in the urine. L. F. T.

Preliminary Chemical Investigation of the Berries of Rhus Glabra, Linné, G. H. McFadden and R. L. McMurray, *J. A. Ph. A. 25,* 1154 (1936). Cleaned, air-dried berries were reduced to a No. 20 powder. Moisture was determined by the Bidwell-Sterling method and was found to be 5.25 per cent. A Dragendorff selective solvent determination was made, and calculated to both air-dried and anhydrous condition. Figures are given for crude fibre, pentosan, total nitrogen, arsenic, ash determinations, ash constituents, total ether-soluble extractive, volatile and non-volatile ether-soluble extractives. Constants of the oil from petroleum-ether extractive are given as

*Ref. cit.

follows: Refractive Index at 20° C. 1.4719, Density at 20° C. 0.9227, Optical Rotation at 20° C. 0.0000, Acid Value 8.97, Iodine Value 87.17, Ester Value 150.23, and Saponification Value 159.20.

M. S. D.

Developing New Domestic Drugs, A. W. von Struve, *Amer. Prof. Pharm.* 2, 33 (1936). The author recounts the story of the early New Hampshire physic garden of the Shakers and its relation to their mysterious income. It is now realized that the rocky soil of New Hampshire is suited for the cultivation of certain medicinals such as digitalis, thyme, peppermint, hoarhound, catnip, basil, camomile, wormwood, lavender, caroway, burnet, sweet marjoram and lemon balm.

Since the figure for crude drug importation into the United States has been rising, the government favors a policy of putting at least a part of this money into the hands of domestic farmers. Peppermint is cited as an excellent possibility. At the present, at Pembroke, N. H., experiments are being conducted by the W. P. A. to explore the suitability of the soil for cultivation of certain medicinal plants. Mr. Frederick W. Baker, a pharmacist and pharmacognosist is the government supervisor of this area. M. S. D.

Oat Flour as an Antioxidant. F. N. Peters, Jr. and S. Musher, *J. Ind. Eng. Chem. 29,* 146 (1937). Rapid transportation, better control of humidity, new and improved refrigerants and better methods of handling and packaging have served to make available fresher and more wholesome foods. However, while spoilage due to bacterial and mold growths has been greatly reduced, comparatively little has been done to decrease oxidative deterioration. In foods the most easily recognized sign of oxidative deterioration is rancidity, the final result of a comparatively long series of reactions of which loss of aroma and development of bland or insipid flavor are preliminary stages.

Many patents have been issued claiming that fats and oils can be stabilized by substances such as carotinoid pigments, lecithin, hydroquinone, etc. but the use of most of these is prevented by lack of approval of food administration officials.

This paper is a preliminary report regarding edible antioxidants, with particular reference to oat flour. Special grades of the flour are being marketed for different products under the brand name "Avenex" and may be incorporated in food materials by: (a) intimate mixing or infusion, as in lard, oleomargarine, peanut butter, etc.; (b) dusting or coating, as on potato chips or salted nuts; or (c) coating paper or other packaging material which comes into contact with foodstuffs such as butter, lard, bacon, coffee, etc. Products treated with oat flour are said to be "Avenized".

Experiments with cottonseed oil compound shortening, castor oil, lard, oleomargarine, potato chips, salted nuts, and other products indicated that oat flour possesses definite antioxidative properties. Other experiments, in which "Avenized" paper, containing 1 to 5 per cent. of oat flour in the sizing or waxing material, was used as a wrapper for lard indicated that such lard had a much lower peroxide number than a sample wrapped in untreated paper. A. O.

Chemical Constants of Beeswax. B. Grodman, *Chemist Analyst 25,* 81 (1936). The determination of the acid and saponification values are largely depended upon to show quantitatively the adulteration of beeswax with foreign fats or waxes. The usual method of analysis in which alcohol or alcoholic solutions are used as solvents gives results which in duplicate analyses may vary by several whole numbers. In determining the acid value the cooling of the hot alcoholic solution causes the precipitation of wax constituents with occlusion of the free acid, requiring reheating and subsequent addition of alkali; in determining the saponification value the precipitation of wax constituents by cooling and by addition of aqueous acid volumetric solution causes occlusion of part of the excess alkali which reheating does not entirely eliminate.

In the following procedures, as developed by the author, the analyst will find it easy to obtain check results. Acid Value Determination: To 5 grams of wax in a 250 cc. Erlenmeyer flask add 75 cc. of a neutral mixture composed of 2 parts of benzol and 1 part of alcohol, heat under a reflux condenser until the sample is dissolved, cool to room temperature, add phenolphthalein indicator and titrate with 0.5 N alcoholic KOH. Acid value = cc. 0.5 N KOH x 28.075 divided by weight of sample.

Saponification Value Determination: To 5 grams of wax in a 250 cc. Erlenmeyer flask add 75 cc. benzol and 25 cc. of normal alcoholic KOH and boil gently under a reflux condenser, water-cooled, for two hours. Carry out a blank determination at the same time using the same quantities of reagents. Titrate, while hot, using phenolphthalein as indicator, with 0.5 N H_2SO_4. The difference between the number of cc. of 0.5 N H_2SO_4 consumed by the blank and the number of cc. of the same acid required to neutralize the excess of alkali is the alkali equivalent in cc. of 0.5 N KOH consumed in saponifying the esters in the wax and combining with the free acids. This difference multiplied by 28.075 and divided by the weight of the sample gives the saponification value. F. X. M.

Drug Collecting and Cultivation in Mississippi, W. W. Barkley, *J. A. Ph. A., 25,* 1156 (1936). Mississippi has a range of about 800 feet in altitude and 300 miles in latitude, and an appreciable variation in rainfall and winter temperature when comparing the southern with the northern areas. Although these differences may be instrumental in producing differences in vegetation, the nature of the soil must be the dominant factor. Ten distinct topographic and geologic regions are named—Tennessee River Hills, Northeastern Prairie Belt, Pontotoc Ridge, Flatwoods, North Central Plateau, Jackson Prairie Belt, Loess or Bluff Hills, Yazoo-Mississippi Delta, Long Leaf Pine Belt and the Coastal Pine Meadows.

Much of the crude drug material which finds its way into local use is through small collectors who make their living in this manner. Although certain plants such as gold thread, Ginseng and Hydrastis are becoming rare, owing to the greed of collectors, certain others are more abundant than formerly due to the abandoning of agricultural operations and the return of the fields to their natural condition. There is opportunity for bolstering family income through collecting the local drugs.

A number of rules are given in the paper for the collector to follow. The author then emphasizes the possibility of successful drug plant cultivation in Mississippi and appends a list of almost 100 Mississippi drug plants. M. S. D.

Syrup of Ammonium Mandelate. B. Fantus and O. U. Sisson, *J. A. Ph. A. 25,* 1138 (1936). Recognizing the increasingly exten-

sive use of mandelic acid, the advantages of administering it in the form of an ammonium salt, the unstable character of such a salt, and finally the desirability of the pharmacist being able to prepare an efficient and satisfactory product, the authors present the following formula for a syrup of ammonium mandelate.

Soluble saccharin	1 gm.
Ammonium chloride	50 gm.
Ammonium carbonate	80 gm.
Mandelic acid	200 gm.
Sucrose	400 gm.
Benzaldehyde	0.04 cc.
Oil of Fennel	0.1 cc.
Anethol	1 cc.
Fluidextract of Glycyrrhiza	175 cc.
Distilled water, a sufficient quantity to make	1000 cc.

In a capacious vessel mix the mandelic acid and ammonium carbonate with 400 cc. of warm distilled water and let stand until effervescence ceases. Dissolve the ammonium chloride, saccharin and sucrose in this solution by agitation. Add the fluidextract in which the oils have been dissolved, and finally a sufficient quantity of distilled water to make 1000 cc.

Average dose—15 cc.—representing 3 gm. of mandelic acid and 0.75 gm. of ammonium chloride.

This preparation is basically sound and comparatively simple to prepare. The ammonium chloride, a necessary adjunct to the administration of mandelic acid in order to form an acid urine, is incorporated as part of the original preparation to the limit of palatability. It might, however, be replaced with an equal amount of sugar if desirable. The saccharin is required for additional sweetness and the other flavoring agents are representative of the "bouquet" found in the new N. F. Syrup of Glycyrrhiza. A. B. N.

Sodium Chlorite as a Volumetric Oxidizing Agent. D. T. Jackson and J. L. Parsons, *Ind. Eng. Chem. Anal. Ed. 9,* 14 (1937). So-

dium chlorite, $NaClO_2$, is now available commercially in sufficiently high purity to be considered a laboratory reagent. Its use as a volumetric oxidizing agent has been investigated by the authors and they recommend its application in the determination of sulfurous acid and sulfites. The procedure in this case is, briefly, as follows: The sample is added to a mixture of potassium iodide solution, acetic acid, and starch solution. The standard chlorite solution is run in until the blue starch-iodine color persists. The reactions are as follows:

$$(1)\quad ClO_2^- + 4I^- + 4H^+ \rightarrow Cl^- + 2I_2 + 2H_2O$$
$$(2)\quad 2H_2O + 2I_2 + 2SO_3^{--} \rightarrow 2SO_4^{--} + 4I^- + 4H^+$$

To standardize the chlorite solution a measured quantity of it is added to an excess of potassium iodide solution acidified with acetic acid. The iodine so liberated is titrated with a standard thiosulfate solution. The stability of chlorite solution was studied and it was found to be entirely stable in bottles which were protected from light; exposure to light resulted in progressive deterioration. It is suggested that chlorite solutions may become more generally useful for quantitative oxidations. L. A. R.

Adsorption of Ions and the Physical Character of Precipitates. G. E. Cunningham, H. E. Gabler, W. S. Peachin. *J. Physical Chem. 40,* 1183 (1936). The effects of adsorbed ions in determining the nature of certain precipitates is well known. The authors in a former paper concluded that in the last analysis, certain precipitates were either gelatinous or non-gelatinous, depending upon the degree of hydration of the ions adsorbed. In the case of a gelatinous precipitate the neutralizing ions not only carried sufficient water to form a protective coating about the micelles but the protective water at the same time usually acted as an adhesive, loosely binding the precipitated particles together. Ions of intermediate hydration gave intermediate types of precipitates. The authors report the effect of varying both positive and negative adsorbed ions on both a positive colloid ferric oxide, and a negative colloid bentonite.

In general the results indicated that with ions of opposite charge the effect was directly proportional to their degrees of hydration, which degree of hydration decreases with increasing atomic weight. Thus

a positive ferric oxide sol when precipitated with various anions had its volume of precipitate in the order

$$Cl > Br > I \text{ and } ClO_3^- > BrO_3^- > IO_3^-$$

With bentonite $Li^+ > Na^+ > K^+$ and $Mg^{++} > Ca^{++} > Zn^{++}$ and $Ca^{++} > Sr^{++} > Ba^{++}$

With ions of similar charge to that of the colloid some discrepancy was noted with respect to the ferric oxide results; e. g. the order was practically reversed. This was explained by the hypothesis that such cations having a similar charge would act to some degree as stabilizing ions and the heavier ions would be more strongly adsorbed, resulting in a similar adsorption of the anion which would increase the bulk of the precipitate.

In practically all cases the results were in agreement with the familiar Hofmeister series for their effect on the swelling of gelatin, i. e., those ions giving precipitates of least bulk are the ones making gelatin most fluid and vice versa.

The results of this paper should be of value in controlling the consistency of many products such as pastes. L. F. T.

The Determination of Casein by Formol Titration After Precipitation With Acid—An Improved Technique. F. H. McDowall and A. K. McDowell. *The Analyst, 61,* 824 (1936). The conditions of titration of casein precipitated from milk and re-dissolved in N/10 NaOH have been defined in detail. The formol titer is influenced by the volume of the solution, the formalin concentration and the temperature, but is not affected by variations in the time allowed for the action of the formalin.

The following procedure has been suggested: The milk (20 cc.) is diluted with 100 cc. of water at 42° C. in a beaker, and the casein precipitated with acetic acid and sodium acetate. The mixture is decanted, the precipitate again washed and decanted. After a second washing and decantation the precipitate is transferred to the filter paper and gently sucked until free from liquid. The preciptate is washed back into the original beaker and dissolved in 4-5 cc. N/10 NaOH. Total volume, including precipitate, should be about 20 cc. The beaker is placed in a boiling water-bath for 5 minutes, then cooled to 21-24° C., 1 cc. of 1 per cent. phenolphthalein solution added

and N/10 NaOH added until faint pink color is obtained. Four cc. of formalin (40%) are added and titration with standard alkali continued to the same end-point.

The percentage of casein is given by the formula: Casein (%) = cc. N/10 NaOH for formol titration from 20 cc. of milk X 0.92.

The authors claim an accuracy of ± 0.05 per cent., using the Moir method of casein estimation as standard. W. G. B.

A Check on Prescription Room Equipment, Druggists Circular, 81, 24-25 (1937). This article is of particular interest to the prescriptionist or one contemplating purchasing prescription department equipment. It shows the trend of State Boards of Pharmacy to require a definite minimum of equipment for those pharmacies rendering prescription service and also the demand for special equipment if the pharmacist wishes to manufacture preparations of a special type for dermatologists, dentists and other practitioners.

The list of (minimum) equipment which is taken from the regulations of the New Jersey Board of Pharmacy is of particular interest and includes equipment for sterilizing solutions and containers, graduates capable of accurately measuring 1 cc., collapsible tubes, thermometers recording from 0° to 250° C. and metric weights up to 1 kg.

Attention is called to the possibilities of a homogenizer as a new piece of equipment for the prescription department. It has found considerable use in the preparing of emulsions, ointments and lotions. Reference is also made to a motor-driven tablet machine, operated from the lighting circuit. H. P. F.

Some Papers Read at the Atlantic City Meeting of the American Association for the Advancement of Science and Associated Societies, Science-Supplement, 46, Science, vol. lxxxv, No. 2197. Studies of antigens undertaken in the hope of finding more effective ways of using them to protect against disease were reported by Dr. Stuart Mudd, of the University of Pennsylvania School of Medicine. The use of bacterial vaccines to protect against disease and to produce curative serums has often been limited by the toxicity of the vaccines used.

If the pure substances required for immunization could be obtained free from the other toxic substances, the problem would be greatly simplified. On the other hand, the chemical methods used to obtain immunizing bacterial substances have been too drastic and have often destroyed the value of the very substances it was desired to use. Dr. Mudd described three new physical methods of disintegrating bacteria without destroying their immunizing substances. With one of these methods, Dr. Mudd and associates, Drs. E. J. Czarnetzky and Horace Pettit and Dr. David Lackman, obtained and purified the delicate immunizing substances of hemolytic streptococci. The surface immunizing substance obtained from these organisms can be broken down into two fragments. One of them has been used to distinguish streptococci which cause human disease from those causing animal diseases. The other has been used to classify the human streptococci into types. The delicacy of the immunizing substances is due to the fact that they can be readily oxidized.

A new tool for use in the study of viruses was described by Dr. Ralph W. G. Wyckoff, of the Rockefeller Institute for Medical Research. It is an air-driven ultracentrifuge which whirls viruses around as milk is whirled in a cream separator, only at such high speeds that the infinitesimal virus molecules settle out. The force required for this is from tens to hundreds of thousands of times that of gravity. Dr. Wyckoff's ultracentrifuge is simple by comparison with a previous model, built in 1912 by another scientist, which was so costly to build and operate that until last year no duplicates had been made. The Wyckoff model should not cost more than three or four hundred dollars to duplicate. With the aid of this new machine investigators have the basis for a method of preparing pure virus without having recourse to chemical treatment. This opens up the way to the study of viruses which are relatively unstable or present only in small amounts. The machine can also aid in measuring the size of virus particles, in telling whether a preparation is pure and what may be the molecular weight of its impurities, and in determining whether a virus consists of one molecular species or a family of related compounds. L. G.

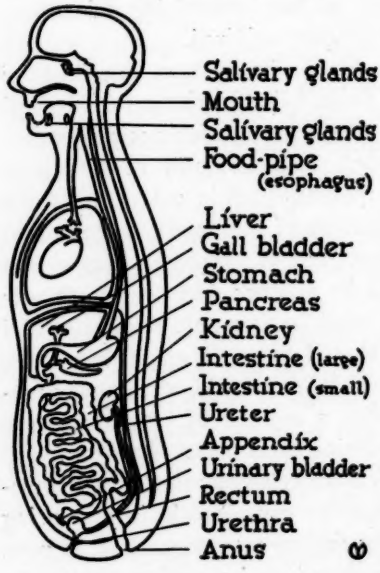
THE CHEMISTRY OF LIFE

Resume by Arno Viehoever and Arnold Koff*
Of the College

This briefly is the story of the chemistry of digestion and excretion as carried out in the regular processes of the organs of the body of the human being.

ALL those chemical processes by which foods are rendered available to an organism are, in a broad sense, digestive processes. Of all the various substances used for the nourishment of the body only a few of the simplest, such as oxygen of the atmosphere, water, dextrose or sugar, and inorganic salts are in a condition to be utilized directly by the body for its upbuilding and growth, as a source of energy, or for its repair. All other substances must be reduced to simpler compounds by which their absorbability or availability is increased.

The Mechanism of Digestion



Location and order of the body's organs.

Digestion actually starts in the kitchen. When food is cooked certain changes, as swelling and softening of the tissues, take place which partially digest the food or make it more permeable to digestive fluids.

The food that enters the mouth is masticated by the teeth. At the same time the salivary glands excrete saliva which mixes with the food. This mass then passes through the esophagus into the muscular stomach. Here the food is mixed with the gastric ferments and churned until the stomach has finished its share of the digestion. Food now goes into the small intestine where the remainder of the digestion and practically

*From The Laboratory of Biological and Biochemical Research, supported by Mr. William H. Gross.

all of absorption takes place. At this point the digestive ferments from the pancreas, and the bile from the gall bladder of the liver are introduced. The former is an aid to digestion, the latter is an aid in absorption. Undigested matter is eliminated as mentioned below.

After the conversion the foods are absorbed through the mucous lining of the small intestine into the blood stream. The blood, a liquid tissue, penetrates all the crevices of the body and comes into intimate contact with every cell and exchanges food and waste products with it.

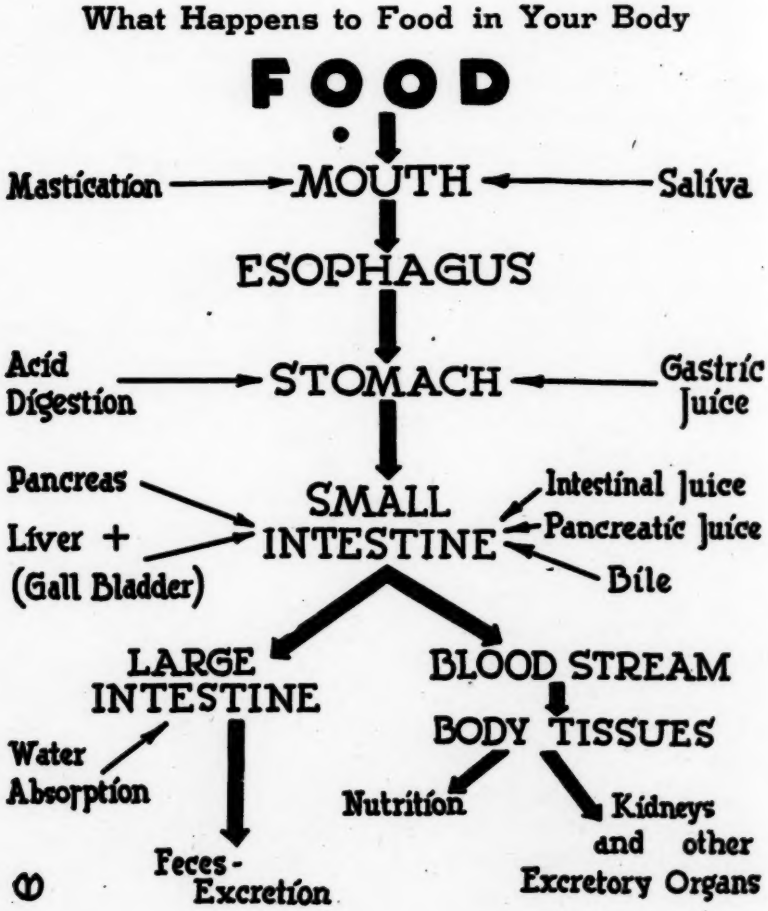
These waste products are then carried by the blood to the kidneys and other excretory organs. The waste from the kidneys collects in the bladder before final elimination. The residual mass of material remaining in the intestine after the full and complete exercise of the digestive and absorptive substances is ultimately expelled from the body through the rectum as feces.

The saliva released by mastication has two functions, to aid swallowing and to assist in the digestion of starches. These functions are subserved by two different constituents of the saliva. The former by the water and lubricating mucin; the latter function by ptyalin, one of the enzymatic substances or biochemical agents, capable of inducing and expediting specific chemical changes. Ptyalin is an amylolytic enzyme, so called because it possesses the property of transforming starch into simpler bodies. The products of its amylolytic action are dextrose and maltose.

Gastric digestion takes place in the stomach and is promoted by the gastric juice, which is secreted by the glands of the stomach and its mucous lining. The enzymes present in this fluid are pepsin, gastric rennin, and gastric lipase. The most important of the enzymes of the gastric juice is the proteolytic enzyme pepsin. The protein molecule is broken up (hydrolyzed) in the presence of this enzyme into simple units (proteoses and peptones). Gastric rennin is known as the milk curdling or protein coagulating enzyme. Rennin acts upon the cheese-like casein of the milk, splitting it into a peptone-like body and a more soluble substance (paracasein). Gastric lipase,

the third enzyme of the gastric juice, is a fat splitting enzyme. The digestion of the fat in the stomach is, however, at the most, of but slight importance as compared with the digestion of fat in the intestine through the action of lipase of the pancreatic juice.

Pepsin digestion takes place in the stomach at an optimum of approximately 0.1 per cent. hydrochloric acid (pH value of 1.6-1.8)



which is an acid medium. As soon as the food mixture leaves the stomach it comes in intimate contact with the bile and pancreatic juice. These alkaline fluids neutralize the hydrochloric acidity of the mixture from the stomach. Since these fluids are alkaline in reaction there is little peptic activity due to pepsin.

The pancreatic juice reaches the intestine through a special duct which opens into the intestine near the stomach outlet (pylorus).

The pancreatic secretion contains at least four enzymes: trypsin, erepsin, amylopsin and steapsin. The most important of these enzymes is the proteolytic enzyme trypsin. This enzyme resembles pepsin insofar as each has the power of breaking down protein material, but the trypsin has much greater digestive power, particularly in neutral to alkaline fluids, and is able to cause a more complete decomposition of the complex protein molecule.

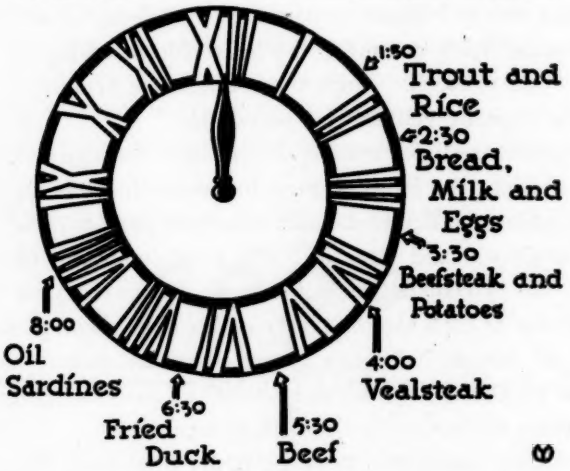
Amylopsin, pancreatic amylase, is an amylolytic enzyme which has somewhat greater digestive power than the salivary amylase, ptyalin. Its activity is confined to the starches, as its name implies, and the products of its amylolytic action are dextrines and maltose.

Steapsin, pancreatic lipase, is a fat splitting enzyme. It has the power of splitting the neutral fats of the food, by hydrolysis, into a fatty acid and glycerine.

The enzymes of the intestinal tract are of great importance to the animal organism. These enzymes include erepsin, sucrase, maltase, lactase, and phosphatase. Erepsin splits up the partially digested proteins into their simplest forms which are so-called amino acids. The three invertases, sucrase, maltase and lactase, reduce their respective sugars with the formation of the glucose, fructose and galactose. Phosphatase splits up organic phosphorous compounds and yields inorganic phosphorous compounds and the organic component.

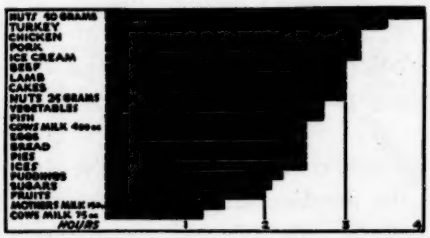
The bile is secreted continuously by the liver into the gall bladder, and passes into the intestine through the common bile duct which opens near the pylorus. The bile assists materially in the absorption of fats from the intestine by its solvent effect on the fatty acid formed by the action of the pancreatic juice.

FOOD PASSAGE THROUGH THE HUMAN SYSTEM.



This clock above represents the approximate length of time that is required for a meal eaten at noon, to leave the stomach.

The diagram below shows the evacuation time of standard foods by a normal stomach. These figures are for 100 grams (approximately ¼ lb.) of food, unless otherwise stated. (After Hawk, Rehfuss and Bergeim, 1926.) The passage of food through the entire food canal varies greatly with the nature of the food and the individual and may take from 2 to 3 days in a human being. The walls of the entire food canal are living, movable tissues, as elastic as rubber.



In the healthy body every meal starts a natural peristaltic (wave-like) movement which assists in the passage of food through the body.

The importance of certain hormones for the stimulation of digestive action, as acetylcholine, has been indicated. Its presence in salivary glands has been mentioned in literature, and digestive tissues as stomach and particularly the small intestine have been found to contain more than 1 part per million.

There is also considerable evidence that vitamins, present in balanced diets, play a significant role in the normal function of the gastro-intestinal tract. Specifically vitamin A is credited now with furthering appetite and digestion; vitamin B with increasing appetite and flow of digestive juices, thus preventing constipation; and vitamin B_2 (G) with preventing diarrhea and other digestive disturbances.

Unquestionably the biochemical understanding and control of food intake, utilization and elimination, are basic requirements for the maintenance of general good health.

PRESERVING SOLUTION FOR GREEN PLANTS

Formaldehyde solution U. S.	100 cc.
Formic acid	50 cc.
Copper sulfate	2 gm.
Deceresol OT 10 per cent.	50 cc.
Denatured alcohol	550 cc.
Water, to make	1000 cc.

The copper sulfate is dissolved in 100 cc. of water then added to the other ingredients and finally brought to proper volume with water.

This liquid is applicable to all chlorophyll bearing plants. A normal green color is maintained over a considerable period of time.

I. G.

RECENT DEVELOPMENTS IN THE FIELD OF ANTISEPSIS

By Louis Gershenfeld, P. D., B. Sc., Ph. M.
Of the College

Antiseptics: A Comparative Study of Laboratory and Practical Tests. George F. Reddish, *J. A. Ph. A. 25,* 1117 (1936). Liquor Antisepticus N. F. VI passes the F. D. A. test for soluble liquid antiseptics and it is shown to be effective in killing bacteria under practical conditions of use. Under the conditions of use in the oral cavity it reduces the bacterial count to a significant degree, an average reduction of 96.7 per cent. being demonstrated.

These findings give added assurance that the standard Food and Drug Administration method of testing liquid antiseptics is satisfactory as a means of estimating the effectiveness of such antiseptics for practical use.

Mechanism of Inactivation of Mercurial Antiseptics by Serum, and Its Implications Regarding the Possibility of Intravenous Antisepsis. D. E. Smith, E. J. Czarnetsky and S. Mudd, *Am. J. Med. Sci. 192,* 790 (1936). The efficacy of several mercurial antiseptics was noted in salt solution and in serum, and it was demonstrated that the inhibiting effect of serum and mercury were not merely less bactericidal but were devoid of bactericidal action.

Antiseptics in Obstetrical Practice. S. Pearson and J. Urner, *Mod. Hosp. 47,* 67 (1936). An interesting study on the use of antiseptics in obstetrical practice was presented covering the use of three different antiseptics and five methods of their application to patients prepared for delivery. The use of a spray method of preparing patients for delivery was recommended and iodine revealed better germicidal action than merthiolate and methaphen.

Foreign publications contain additional evidences reporting on the value of Prontosil.

Treatment of erysipelas with Prontosil, Martenstein-Soc. Dresden Dermatologist, meeting (Feb. 12, 1936); through *Dermatol. Wochscr. 103,* 1587 (1936).

Multiform exudative erythema treated by Prontosil, Schreiber-Soc. Dresden Dermatologist, meeting (Feb. 12, 1936); through *Wochschr. 103,* 1587 (1936).

In both of the above, the oral administration of Prontosil daily resulted in prompt recovery.

Sulfamides in Treatment of Erysipelas. M. H. Bloch, M. Conte and P. Durel, *Presse Med. 44,* 1583 (1936), through *J. Am. Med. Assoc. 107,* 2094 (1936). Clinical and experimental observations were made; 250 patients with erysipelas were treated with Prontosil and other sulfamide derivatives. The evolution of the disease was modified in all instances especially as to the action on the temperature and erysipelatous plaques. If given early at the onset of the erysipelas, complications were markedly reduced.

Prontosil in the Treatment of Pyuria in Children. H. G. Huber, *Munch. Med. Wochschr. 83,* 2014 (1936). Fourteen children with pyuria responded favorably to treatment with Prontosil.

Is p-Aminobenzenesulfonamide the Active Agent in Prontosil Therapy? A. T. Fuller, *Lancet 232,* 194 (1937). The hypothesis has been advanced by Trefouel and others (C. R. Soc. Biol. Paris *120,* 756, 1935) that Prontosil itself has no antibacterial action but is effective only when reduced to sulfanilamide in the body. In a series of experimental and clinical investigations in which determinations were made on urinary and blood samples of animals and patients who received Prontosil by mouth and Prontosil-Soluble parenterally. Fuller concludes that a considerable amount of sulfanilamide is excreted when Prontosil is given by mouth or by injection; and it is possible that the therapeutic action of Prontosil is due to the sulfanilamide derived from it by reduction in the body.

SUNBURN PROTECTION MEASURED

The painful manifestations of sunburn are caused, so the scientists say, by a very limited range of wave lengths in the ultra-violet band. The peak of blistering activity is at 2970 Angström units. A recent test of the screening or sunburn protecting value of a number of tests furnishes the following interesting, though incomplete, data.

Tests with Ultraviolet Sun Burn Radiometer*

Titanium Phototube—Sensitivity 6
Time 11:00 A. M. to 2:30 P. M.
Clear Sky Reading
Micro amp. 45-50

	Absorption Percentage of Ultraviolet Region 2900-3200 Angstrom Units	
Solvents and Vehicles		
White Mineral Oil	0	
Cocoanut Oil	23	
Peanut Oil	24	
Olive Oil	23	
Poppy Seed Oil	23	
Cotton Seed Oil	26	
Sesame Oil	39	
In Water	1%	5%
Quinine Bisulfate	31	98.5
R Salt (2.3.6 Naphthol disulphonic acid sodium salt)	14	65
Beta oxy Naphthoic Acid (alkaline)	36	98
Aesculetine (alkaline)	94	..
Resorcin	4	9.9
Cystine (alkaline)	5	12.5
In White Mineral Oil		
Benzamidazol	40	..
Benzyl Cinnamate	0	5
Phenol ether of Phenyl Salicylate	42.5	..
Abietin	28	..
Xanthon	94.2	..

I. G.

*High absorption values indicate, of course, a high sunburn protection. The table is from a bulletin issued by Van Dyke & Co., N. Y.—I. G.

DAPHNIA, AS A BIOLOGICAL TEST ANIMAL

By Arno Viehoever

Director of Biological and Bio-chemical Research at the College

General.

According to the work of the author and his associates, enumerated in the list of references given below, Daphnia is well suited for the biological evaluation of drugs and medicines. As this animal, belonging to the crustaceae, is transparent, its internal body mechanism and certain fundamental tissues of the muscular, nervous and glandular system, are readily visible.

Thus the effects of stimulants, as well as of depressants, upon such organs as the heart or the breathing and digestive organs, may be observed. The response to the administration of varied quantities of substances, from minute to toxic and fatal doses, may be studied. The examination may be of an exploratory, qualitative nature—or, by the use of many standardized animals, of quantitative import.

Breeding.

The breeding of daphnia for experimental purposes may be readily effected, with the careful observation of conditions, found optimal for their growth, development and propagation. As described in detail elsewhere, dilute culture media, containing for instance animal blood or excrements, as dried shredded sheep or cow manure, suspended in good drinking water, in concentration not to exceed 0.1 per cent., permit the growth and maintenance of unicellular organisms as bacteria and protozoa, and, if placed in the light, of algae. One or the other or all of these may serve as food for daphnia. The steady availability of oxygen, the practical absence of chlorine, hydrogen sulphide, of substantial amounts of carbon dioxide, the alkalinity regulated to a hydrogen ion concentration of approximately pH 8 are factors requiring continued attention.

Life Cycle.

Of particular advantage in the use of daphnia as test animals are (1) the rapid life cycle of daphnia from egg to egg-bearing animal, accomplished in the short time of approximately two to three weeks, depending on environmental conditions of temperature and food; (2) the great number of young born, up to fifty from one animal, at one time; (3) the astounding vitality during its life span of approximately

ninety days; (4) the parthogenetic development of the summer eggs, assuring great uniformity of the young and their complete development without fertilization; (5) the possibility of selecting at will, through control of the environment, the selection of sex, females or males, as limited food supply favors the formation of males, and low temperature that of winter eggs, much more resistant than summer eggs.

Testing: A. Laxative.

The testing has given particularly satisfactory results with two to three-week-old animals.

Most comprehensive thus far has been the testing of laxative drugs, of salines, vegetable drugs, of manufactured and synthetic products. The knowledge is still too vague of the chemical nature of the active substance or substances present in these widely used vegetable drugs as rhubarb, senna, cascara and aloes, and in the so-called drastic drugs as podophyllum, to permit their chemical evaluation. The biological testing of these cathartic drugs or substances derived therefrom has however been shown to be possible with daphnia. Indeed most satisfactory have been the quantitative comparative results obtained with daphnia, when standardized for uniform age, sex, development and vitality. Here the time and speed of evaluation of the totally filled, very conspicuous food, canal was noted.

B. Other physiologically active substances.

The harmful effects of certain substances as aloin upon the kidney have also been observed. The usefulness of daphnia in comprehensive biochemical studies as that of amygdalin has been demonstrated. The physiological effects of cantharidin upon the sex organs of the male, of alkaloids as morphine, caffein and strychnine, of alcohol, chloroform, ether benzaldehyde and methyl salicylate, as well as hydrocyanic acid and many other substances, has been observed. The beneficial effects of phenobarbital, as an antidote of strychnine and picrotoxin, of digitalis and its glucosides as a counter-agent of chloroform depression are but some additional examples illustrating the possibilities of using the transparent daphnia as a living or biological reagent.

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(3) Viehoever and A. S. Mikuriya	Effect of Strychnine upon Daphnia	*J. A. Pharm. Assn. 21,* 239-242, 1932
(4) Viehoever	Effect of Pheno-Barbital on Daphnia, on Strychnined Daphnia	*Micro Movies*—1934
(5) Viehoever	Effect of Cascara on Daphnia	*Micro Movies*—1934
(6) Viehoever	Evaluation of Aloe	*A. J. Pharm. 107,* 47-72, 1935
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(18) Viehoever	"Daphnia Propagation for Experimental Use"	*A. J. Pharm. 107,* 103-130, 1935
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THE NATURE OF VIRUSES

(Stanley's Discovery)

Most individuals are aware of the fact that many diseases are caused by organisms visible under the microscope and it is possible in most instances to study them in cultures on artificial media. There are, however, some causative agents of certain diseases which are invisible under the microscope with ordinary illumination, are as yet uncultivable on lifeless media, and usually pass through the pores of porcelain filters. For lack of more appropriate names, these agents of disease have been called "filtrable viruses," "ultramicroscopic viruses" and "inframicrobes." Though other names have been proposed as "microplasms," "protista," "strongyloplasms" and "chalmydozoa," the designations ultramicroscopic virus, filtrable virus and merely virus are generally employed. The term virus by itself has become sufficient as a name for these agents, as today filtrability is not considered of definitive significance.

The virus diseases of plants and animals are numerous and important. Rivers (Filterable Viruses, Williams and Wilkins Co., Baltimore, 1928) gives a detailed review of many of these diseases and the nature of the viruses concerned in the production of the latter. Among the virus diseases of man are to be found: smallpox (variola) and vaccinia (cowpox), chickenpox (varicella), measles, mumps (epidemic parotitis), poliomyelitis (infantile paralysis), epidemic encephalitis (so-called American sleeping sickness), rabies (hydrophobia), yellow fever, dengue fever, pappataci (sand-fly or three-day) fever, psittacosis (parrot disease), foot and mouth disease (though found mainly among cattle); and even some forms of the common wart (verruca vulgaris) and various types of infectious vesicular eruptions of the skin as herpes simplex (simple fever blister) and herpes zoster (shingles) as well as trachoma, the common cold and epidemic influenza are said to be caused by viruses. Among the virus diseases of plants and animals are to be found: mosaic disease of plants (affecting especially tobacco, tomatoes and potatoes), silkworm jaundice, chicken diphtheria, chicken sarcoma, leukemia of chickens, fowl pox, fowl plague, distemper of dogs, rinderpest, pleuropneumonia of cattle, hog cholera, sheep pox, catarrhal fever of sheep, African horse sickness and pernicious anemia of horses.

It is commonly assumed that the filtrable viruses are protein in nature, inasmuch as all other living matter contains the latter. They can stimulate the production of antibodies thus serving as antigens. Other characteristics have been studied and are known, as their size, electrical charge, adaptation, resistance to physical and chemical agents, cultivation, etc. It remained for Dr. Wendell M. Stanley, thirty-two-year-old biochemist of the Rockefeller Institute for Medical Research, to present what is a noteworthy contribution to the knowledge of the nature of viruses. He was awarded the fourteenth annual association prize (of $1000) at the recent meeting of the American Association Advancement of Science for his paper entitled "Crystalline Tobacco-Mosaic Virus Protein."

It is impossible to evaluate at present the far reaching significance that Stanley's contribution is bound to make. He used the tobacco-mosaic virus for his studies, as this is one of the earliest viruses known, is regarded as a typical virus and is readily obtainable in large quantities. He isolated from mosaic-diseased tobacco a crystalline protein, possessing the properties of the virus. This compound possesses a high molecular weight (seventeen million) and does not exist in normal plants. Chemical, physical and other activities of the protein isolated from different mosaic-diseased tobacco plants have been studied by him and reveal definite evidence that this protein is in reality the tobacco-mosaic virus. A closely related crystalline protein was isolated from mosaic-diseased tomatoes, spinach and phlox plants. As reported by Vincent du Vigneaud (*Science 85*, 132 (1937)), "Infection by the virus may be regarded as due to the introduction of a few molecules of the virus protein into a susceptible host. These few molecules apparently have the ability to so disarrange the normal metabolic reactions as to cause the cell to manufacture more of the virus protein. The work has also indicated that in the production of the virus protein by the host new strains may arise, through perhaps the chance production of one or more molecules of a slightly different structure, thus giving mutation of the virus. As Stanley has pointed out, the virus can not be regarded as simply an autocatalytic agent, but must be regarded as a new type of super-catalyst, being able to cause the cell to produce more molecules in its own likeness."

Of course, it may be found that all of the agents now regarded as viruses may not prove to be high, molecular weight proteins, but

Stanley's observation may be useful in an attempt to further identify the other viruses. What however is of great import is as Stanley says: "It is now possible to list protein molecules along with living organisms such as bacteria, fungi and protozoa as infectious disease producing agents."

Louis Gershenfeld.

PROTAMINE ZINC INSULIN

For Better Blood Sugar Control in Diabetes

Since its discovery by Hagedorn and his associates (Denmark) Protomine Zinc Insulin has been clinically studied and reported upon quite extensively in the medical literature. Having shown in many cases a distinctly more desirable action than insulin, per se, with regard to blood sugar control, it is now marketed by several of the leading manufacturers of this country, all production being approved by the Insulin Committee of the University of Toronto.

The product itself is an insoluble suspension of a compound resulting from the combination of insulin with the base protamine in the presence of small amounts of zinc. In the absence of this metal the compound behaves physiologically in a quite different manner. Inasmuch as the product is a suspension, it is very important that the container be shaken well before a dose is withdrawn.

The advantages of protamine zinc insulin are as follows: First, due to its relative insolubility (about the same order as $BaSO_4$) its action in reducing blood sugar is both retarded and prolonged. Second, in many cases fewer injections are required, usually only one per day. The variations in the blood sugar curve of the diabetic are over much more narrow limits, and hypoglycemia is less frequently encountered. There is also some indication that a less restricted dietary control may be possible.

All companies supplying protamine zinc insulin are packaging one size only, namely, a 10 cc. vial with a potency of forty units per cc.

L. F. Tice.

SOLID EXTRACTS

By Ivor Griffith, Ph. M., Sc. D.

Despite the form in which this information is presented it may be accepted as trustworthy and up-to-date. Original sources are not listed but they may be obtained upon request.

Staying on the "alkaline side" may not be as desirable as the advertisers of certain magmas and sparkling waters would have us believe.

Gallstones apparently can form and survive only by "staying on the alkaline side," it appears from the report of researches by Dr. Maurice Feldman and associates of the University of Maryland School of Medicine. They implanted human gallstones in the gallbladders of dogs. The stones dissolved, apparently because dog bile is more acid than that found in the human gallbladder. Gallstones similarly implanted in guinea pigs, which have alkaline bile, failed to dissolve.

Just what value these findings bring, to the fair, the fat, and the forty, whose gall ducts may be full of pebbles, does not appear in the aforementioned report.

At last science comes to the rescue of those gentlemen, who prefer blondes, but who want them natural.

For a young man who has wondered whether the blond hair of a girl has its natural color, fluorescence affords the following simple test: The girl is induced to stand within range of a source of ultraviolet light. If she is a true blond her hair will retain its luster, but if she has dyed or bleached hair, it will take on a sickly color.

Once upon a time the peroxide blonde sported a hairy persiflage, whose mangy tones could hardly be concealed—for its color and texture were somewhere between a burlap bag and a coyote's tail.

Today, however, the beautician has perfected his bleaching art and the chemical blonde is not so readily identified.

When Columbus, having exchanged bad habits with Lo, the poor Indian, brought the up-to-now unspeakable disease syphilis to Europe,

it had no name. The Spaniards called it the disease of Espanola; the Italians called it the French or Spanish disease; the French called it the Italian or Neapolitan disease; the English and Scotch called it the French disease; and the Russians called it the Polish disease. In 1530 Girolamo Fracastoro, Italian physician, wrote a poem about "Syphilis" a swine herder, representing him as the first man to contract the disease. It was called "Syphilus sive Morbus Gallicus," and it contained all which was then known about the disease and the methods of treatment. In that way the universal name "syphilis" was attached to the disease, thereby relieving all nations of the responsibility.

Psychologists now assert that certain colors sell because they fundamentally obey the laws of color science and certain colors do not sell because they violate the same exacting science.

It is said that athletes of both sexes tend to favor red; intellectuals lean toward blue; egotists glory in yellow; the convivial favor orange and the lovelorn like crimson. Children logically prefer gay, bright colors, while the old folks stick to dull grays, browns and black.

And I suppose the versatile likes his color scheme a polychrome mosaic.

From a mint julep to a hot toddy is quite a thermometric jump and yet those who wish to, may pour either drink down the gastronomic sluiceway without distress. Nor does either appreciably upset the fine control of temperature within the body.

Yet the vital tissues of the body endure changes in temperature very poorly.

A rise of only 10 degrees Fahrenheit is practically fatal.

Apple acid (malic acid) present in many unripe fruits and particularly in mountain ash berries, yields when distilled, maleic or maleinic acid. Recently an English biologist has called attention to the fact that the latter acid has a definite inhibitory effect on the growth of the germs of decay.

Accordingly, and especially because of its nonpoisonous character, it may find wide use in replacing the dangerous fungicides, now almost criminally used as fruit insecticides, substances such as the arsenic and lead compounds.

Persons living in or traveling to flood areas where the water supply may be polluted temporarily can assure themselves of a safe drink of water by adding a drop of iodine to each glass of water. The ordinary tincture of iodine for first aid treatment of cuts does the trick of destroying typhoid fever or other harmful germs. A drop will make as much as a quart of water safe for drinking.

Such was the brand *new* discovery announced in a Philadelphia newspaper. Actually the idea is as old as the hills. As a matter of fact—

One drop of the present official mild tincture of iodine WILL NOT make as much as a quart of water safe for drinking. It requires as high as ten drops.

Urine has been used in a certain branch of the leather tanning industry for ages despite its inherent infective hazards. So too has it been used per se in medicine, though certainly not in refined practice. Urea, its major solid constituent, was the first organic chemical ever to be produced from an inorganic and inanimate origin. This material has many uses in medicine and industry, and still in Philadelphia alone, a score of tons of it are daily thrown to the sea. Fertilizer, plasticizer, resin maker and component of many a synthetic product, it now finds a new use in paint.

A Japanese company is to market a new paint enamel made from urea resin which is designed to withstand heat without discoloring, even up to 150 degrees Centigrade.

Including China in the count a recent estimate of the world's population at the middle of 1931 is 2,073,300,000. The population in the middle of the seventeenth century is placed at 445 millions, and

reviewing various hypotheses find it reasonable to conclude that this total was reached by a very slow and irregular rate of growth over a very long time, followed in the last 300 years by a relatively tremendous spurt not yet ended. This spurt is attributed to scientific discovery and "the application of its results, in the broadest sense including exploration as well as technology, to man's basic problem of how best to cope with and exploit his natural environment." The present rate of increase is stated to be about 1 per cent. per year.

Gold at $35.00 per fine ounce is now more expensive than platinum, which in 1927 commanded a price of $110.00 per ounce, but which by May, 1931, dropped to the unheard of low price of $23.00 per ounce. Nowadays its ounce price is only a few dollars higher, the present official price of the refined element being £7 15s in London. Still that find of a platinum nugget, weighing over 250 ounces, somewhere in the Ural Mountains (Russia) was worth the finder's while. It is now on exhibition at the Demidoff Museum at Leningrad. This is the largest such nugget ever found.

Canada is, however, a busy enough platinum producer, being second to Russia, and ready to expand its production whenever the demand warrants it.

The poet, responsible for the following lines, forgot that the Bible has only this to say of Methusaleh. *He lived—and he died.* No notable contribution did he make to any cause. Some men have packed more service into a decade than this old fellow did in nearly a millenium. But poets must have their swing.

"Methuselah ate what he found on his plate
And never, as people do now,
Did he note the amount of the calorie count—
He ate it because it was chow.
He wasn't disturbed, as at dinner he sat
Destroying a roast or a pie,
To think it was lacking in granular fat
Or a couple of vitamins shy.
He cheerfully chewed every species of food,
Untroubled by worries or fears
Lest his health might be hurt by some fancy dessert,
And he lived over nine hundred years!"

"Looking daggers" has no connection with Daguerre's old tintype photographs, but it is interesting to know that it was an accidental observation that gave that ardent photographer-scientist his real start at discovery.

One day it is said that he was trying out a new kind of plate. It was of silver that had been fumed with iodine vapor. He permitted light from an object to fall on the plate; but since the exposure was for too short a time, he could see no result. A little tired and somewhat discouraged, he put it away in a closet where he kept his chemicals. The next morning, upon going to the closet, he was amazed to find a clear picture etched on the same plate, which had been blank the day before. What had happened?

Daguerre was greatly puzzled. Reasoning about it, he decided that something in the closet was responsible. Which of the many chemicals had caused it? Though there were hundreds of bottles he began his patient search. One by one, he took out a chemical at a time, always putting a freshly exposed plate into the closet. The picture formed each time. At last he reached the very last bottle; and removed that one, too. To his surprise and consternation, the picture seemed to form on the plate without any chemical.

He was almost ready to give up in despair when he spied a dish of mercury on the floor of the closet. Could that be it? Once more he prepared a silver plate and exposed it to light. Into his closet it went, but this time the dish of mercury was gone. Twenty-four hours later he knew the guilty culprit. It was mercury vapor.

Daguerre became famous. The whole world was interested in his "tintype" pictures. They were crude and expensive; but they were different from anything known before. Men and women were glad to have their pictures taken, even though it required that they cover their faces with white powder and sit in the bright sunshine for half an hour.

BOOK REVIEWS

Done by persons, unafraid to upbraid, but perfectly willing to give praise where praise is really due.

TRIETHANOLAMINE AND OTHER ETHANOLAMINES (Properties and Uses). By Emil J. Fischer, Techn. Chemist. Allgem. Industrie-Verlag, Berlin, Lichterfelde. Printed in German, 84 pages. Bound R. Mark 5.60.

Ethanolamines, and triethanolamine in particular, have been recognized within the last eight years as substances of remarkable value in numerous fields of industry. Fischer in his monograph briefly reports (1) the chemistry, preparation and properties (2) utilization in various technical industries (3) detection and determination of triethanolamine (4) its utilization for analytical purposes (5) digest of patent literature, referring to preparation and uses of triethanolamines.

Of pharmaceutical interest is the information given in connection with fats, fatty oils, soaps, water and preparations (emulsions, soaps, ointments, etc.) suitable for cosmetic purposes. Triethanolamine, technically the most important ethanolamine, is a clear oily, thick liquid, not unlike glycerin (though more hygroscopic than this), readily forming with fatty acids soaplike salts, soluble in water. It is miscible with glycerin and soluble in acetone or chloroform, as well as in mineral oil. The aqueous solution has an alkalinity of pH 10.2.

The data given, in particular the extended survey of general patent literature, are of decided interest, for their informative as well as suggestive value.

Arno Viehoever.

THE ART OF COMPOUNDING. By Wilbur L. Scoville and Justin L. Powers. Sixth edition, revised and enlarged, washable cloth. Price $4.75. P. Blakiston's Son & Co., Inc., Philadelphia, 1937.

The new edition of this well known book has been enlarged by approximately 129 pages, most of which is found in the chapter on Incompatibilities which has been more than doubled. New and rather concise chapters on Glandular Products and Vitamins have added to

the size and scope of the volume, while other chapters have been enlarged or condensed but slightly.

In addition to the above-mentioned chapters, others are included on The Prescription; Nomenclature; Mixtures; Adjusted Solutions, which includes colloids, ampuls, hydrogen ions and isotonic solutions; Emulsions; Confections, etc.; Pills; Lozenges, etc.; Tablets; Powders; Suppositories; Ointments, etc.; Sterilization; Biological Products, and Homeopathic Pharmacy.

Each chapter which deals with a class of pharmaceutical preparations carries valuable notes, observations and other data pertinent to the various types of products under consideration. The general text of each chapter is followed by a series of prescriptions with comments, and illustrative of the classes involved. A second set of prescriptions taken from State Board Examinations completes these chapters. A key of comments on the latter are found in a special section at the rear of the book.

The chapter on Incompatibilities consists of notes and comments on the characteristics of individual substances, arranged alphabetically. While the chapter contains 215 prescriptions with comments, and 80 State Board examples, references are made also to certain prescriptions in previous chapters. It would be more helpful to the users of this chapter to have indicated the chapter page number where prescriptions begin, rather than the chapter number itself, since with the latter it becomes necessary to refer to the contents page, thus adding confusion to the references. A separate index to the incompatibility chapter has been included for the first time.

Originally published as a correlation of "helps" for prescription compounding, the book still contains much of interest for students and others, and will undoubtedly continue to serve as a valuable auxiliary text and reference.

Adley B. Nichols.

THE PHARMACEUTICAL RECIPE BOOK. Second Edition. Published by authority of the American Pharmaceutical Association. Price $5.00. 529 pages, including the index.

The Committee on Recipe Book of the American Pharmaceutical Association has at last issued the second edition of this valuable work. Like its predecessor, from which this revision is not greatly differ-

ent, it is a most useful, practical book in the hands of a skilful interpreter. In the active, old-fashioned pharmaceutical laboratory this work will be more frequently consulted than any other of its kind—and with good reason and results.

As might be expected, it carries some peculiar errors of judgment, and of practice. For instance, although permission was granted the first edition to include certain formulas from the established formularies of American hospitals, *providing credit was given to their source,* this revision decided to coalesce the pharmaceutical and hospital formulas into one hodge-podge, but also *omitted all reference to the origin of the hospital formulas,* which is not the most ethical practice.

The Historical Introduction has had more revision, and for obvious reasons, than any other part of the book.

One outstanding defect in the compilation is its sheer neglect of the newer products available for formulation. In that respect it is a decade behind the times.

Triethanolamine, trigamine, the several new and splendid detergents, the new solvents, the new emulsifiers, the new waterproofing, fireproofing, rustproofing, mothproofing agents, all are ignored.

Its next revisers should take a lesson from some of the modern chemical formularies.

L. F. Tice.

THE EXTRA PHARMACOPŒIA. Martindale. Vol. 1, twenty-first edition, 1936. Published by the Pharmaceutical Press, 23 Bloomsburg Square, London, W. C. 1. Price 27/6.

Published by direction of the Council of the Pharmaceutical Society of Great Britain this notable work is as much of a British institution as the United States Dispensatory is American. In some fundamental respects there are marked similarities between these two commentaries, although the U. S. D. is much more than a mere survey of the pharmacologic field. It is a book for the pharmacist, chemist and physician. Martindale, however, in conciseness and coverage, has a certain advantage over the Dispensatory. It is not so diffuse. Its every monograph is a compact, masterly presentation, brought well up-to-date. With reading it, one is impelled to observe

that its compilation has not been a matter of mechanical revising and revamping. So much of it is new, brand new.

For instance there are the monographs on acetylcholine, prontosil, mandelic acid, dinitrophenol, etc. In no other such book do we find so much of a refreshing directness.

On the other hand it lacks something of the readableness of the American authority which has been mentioned. Strangely enough the U. S. D. may be read, and with interest, but Martindale is only for reference. The first is encyclopedic, the second Websterian.

Its bibliography is splendid—its therapeutic index surprisingly positive. This is indeed a book worth while including in the modern pharmacologic library.

Ivor Griffith.

THE NEW UNITED STATES DISPENSATORY (22nd Edition). (The Centenary Volume.) H. C. Wood and C. H. LaWall with Collaborators. J. B. Lippincott Company, Philadelphia. Buckram $15.00.

Since its first edition in 1833 the United States Dispensatory has increased in its popularity and usefulness to those professions representing medical science in its broadest sense. The new edition (22nd), just released, is a worthy addition to this long series covering over one hundred years of scientific progress.

The new book, although it is smaller and lighter than the twenty-first edition, contains 1894 pages, excluding the preface and introduction, which is about one hundred more pages than its immediate predecessor. The subject matter is arranged in three parts. Part I considers in detail the official drugs of the U. S. P. XI and N. F. VI with statements as to all points of dissimilarity in B. P. requirements and specifications. Synonyms, descriptions, methods of preparation, uses both medicinal and technical, pharmacodynamics, posology and toxicology, etc., make up the monograph of each drug and preparation. Part II covers a very complete list of unofficial drugs and chemicals. In this group are not only those drugs which are no longer widely used by reason of their partial obsolescence, but also hundreds of new drugs, chemicals and synthetics which due to their recent introduction are but slightly known. Part III considers the general tests and processes of the U. S. P. XI, the numerous reagents of the

N. F. VI and a very comprehensive set of formulas for diagnostic reagents used in the many tests of the modern clinical laboratory.

The following significant points would seem to stress the value of this book to pharmacists, physicians, and chemists, inasmuch as in no other reference are they available.

First, all the subject matter concerning an individual drug or chemical is grouped together in a uniform sequence, making it unnecessary to refer to several scattered pages for the desired information.

Second, in no other book may be found grouped descriptions, tests, uses, therapeutics, etc., of an authoritative character.

Third, thousands of references to original literature acting as the source of information are given, a particularly helpful feature for one who cares to go deeper into the available information pertaining to some drug.

Fourth, the newer drugs, biologicals and therapy are excellently presented.

Lastly, the scientific authority bestowed on the book by its authors C. H. LaWall, in the province of pharmacy and food and drug chemistry, and H. C. Wood, in that of pharmacology, give it a reliability unequaled in its field, a fact of no little significance in a book which is to adequately serve the purpose for which it is intended.

L. F. Tice.

Decomposition of Barbiturate Solutions by Heat, A. E. Bailey, *Pharm. J. 136,* 620 (1936). The statement of the B. P. that solutions of soluble barbital may be sterilized by heating in an autoclave is criticized. Monosodium derivatives of alkyl and aryl substituted malonylureas when heated in aqueous solution above 100° C., and in some instances at a lower temperature, yield a crystalline precipitate of the mono-ureide of the corresponding disubstituted acetic acid. Thus soluble barbital gives diethylacetylurea. Decomposition is accelerated by a slight excess of free alkali. Sterilization is best accomplished by the use of a Berkefeld or other aseptic filter although barbital-sodium solutions will withstand sterilization by tyndallization.

L. F. T.